

AN important advance in the development of the forestry branch of Armstrong College has been made by an agreement effected between H.M. Office of Woods and the college authorities, by which the latter take over the local management of Chopwell Woods, in the county of Durham. These woods are within a few miles of the college, extend over an area of nearly 900 acres, and carry crops of larch, spruce, Scotch pine, oak, ash, and other trees, most of which were planted about fifty years ago. The woods will be gradually brought under a proper rotation of cropping by the clearing and replanting of the more mature portions from time to time, and the carrying out of this work will afford favourable opportunities for demonstrating the various operations relating to practical forestry. H.M. Commissioner of Woods, Mr. J. F. F. Horner, has obtained the consent of the Treasury to a house being provided in the woods as a residence for the college lecturer in forestry, Mr. A. C. Forbes, and to continue to pay as heretofore the ordinary working expenses of the woods. The arrangement will facilitate the holding of short courses for practical foresters and others desirous of acquiring a knowledge of the subject, while as a practical demonstration area for the students attending the college forestry class the woods will be *invaluable, and should render Newcastle one of the most favourable centres for forestry instruction in the United Kingdom.*

In a paper on social conditions in Australia, read at a meeting of the Society of Arts on May 1, the Hon. J. G. Jenkins, Agent-General for South Australia, dealt with the educational advantages of the country. "Generally speaking," he said, "the system of public education is free, compulsory, and secular, the whole expense being met out of the general revenue. The greatest care is taken to provide schools in every part of the country as well as in the thickly populated cities, and in some of the thinly settled districts schools of from ten to fifteen children are established. Fortunately, Australia's educational advancement has not been delayed by sectarian interference. There it is generally considered that a country's advancement rests on the education of its people, and that as national education is a national gain, the nation's treasury should meet the bill. Efforts have been made from time to time by zealous propounders of sectarian beliefs to incorporate religious instruction with the Education Acts of the different States, but the majority of the people are strongly opposed to any form of State aid to religion. They feel that in the bitter strife for sectarian supremacy the efficiency of the schools would become impaired and the practical education of the children neglected. The parents generally take advantage of the public schools for their children, but for those who object, either from class prejudice or religious scruples, good private schools are available."

PROF. J. F. SELLERS, of Mercer University, recently sent out a number of inquiries to forty-four teachers of chemistry in the southern States of the American union; the answers made by forty of the teachers form a symposium on chemical requirements which was presented to a meeting of the American Chemical Society. The paper is printed in *Science* of May 11. In reply to a question asking if chemistry should be taught in preparatory schools, a majority of five thought it should. Answers to a second question showed that in a small majority of colleges only does chemistry follow a course of physics. Prof. Sellers found that about equal time is given to lectures and to laboratory work, and most teachers consider that individual laboratory work should always form part of a chemistry course. Similarly, there is a consensus of opinion that qualitative analysis should follow general chemistry. The majority of the institutions represented offer graduate work in chemistry. The paper shows that few southern chemistry teachers carry on research themselves, and this is because they are overloaded with instruction or executive duties, and are not supplied with adequate library or laboratory facilities for advanced students. The majority of southern colleges give technical courses, and these are controlled by local demands and natural supplies. The sting of the paper, so far as our universities are concerned, lies in the tail, which is as

follows:—"Once the American universities were replicas of the British system, but now the German university sets the standard. It is this shifting of method and manner that affords us of to-day, in the matter of the practical virtue of our courses in science, an assured guarantee of commercial and industrial progress."

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, March 1.—"The Specificity of the Opsonic Substances in the Blood Serum." By Dr. William Bulloch and G. T. Western. Communicated by Leonard Hill, F.R.S.

Conclusions.—(1) When staphylococci are brought into contact with normal human serum, and are subsequently removed by centrifugalisation, the serum loses its opsonic power for *Staphylococcus*, although the opsonic power of *Bacterium pyocyaneum* is preserved.

(2) Contact of normal human serum with tubercle bacilli leaves the opsonic power of that serum for staphylococcus almost intact, while the opsonic power for tubercle bacillus is completely removed.

(3) Contact of normal human serum with staphylococcus leaves the opsonic power of that serum for tubercle bacillus almost intact, while the opsonic power for staphylococcus is completely removed.

(4) Inoculation of a human being with tuberculin causes quantitative increase in the tuberculo-opsonin, whereas the quantity of staphylococcus opsonin is unaltered.

(5) Inoculation of a human being with staphylococcus vaccine causes a quantitative increase in the staphylococcus opsonin, whereas the quantity of tuberculo-opsonin is unaltered.

March 8.—"On the Relationship between Hæmolysis and the Phagocytosis of Red Blood Cells." By Dr. R. D. Keith.

The conclusion come to is that the phagocytosis of red blood cells does not depend on the presence of the hæmolytic amboceptor, since:—

(1) The substance which induces phagocytosis is partially destroyed by heat, while the hæmolytic amboceptor is entirely thermostable.

(2) The hæmolytic amboceptor may be present in considerable amount in a hæmolytic serum without inducing phagocytosis, notwithstanding prolonged contact of the amboceptor with the red blood cells.

Dean has suggested that phagocytosis may be caused by a complement acting through an amboceptor, and that the partial destruction, of the property in the serum inducing phagocytosis, by heat may be due to the destruction of the complement, while the amboceptor, even in the absence of the complement, may still be capable of inducing phagocytosis. This theory, while it is difficult to disprove directly owing to the complement being destroyed at the same temperature as the thermolabile part of the substance inducing phagocytosis, seems to be an improbable one for the following reasons:—

(1) That it is not an action analogous to that of other amboceptors, e.g. that concerned in hæmolysis. If one destroy the complement of a hæmolytic serum by heat, no hæmolysis takes place, notwithstanding the presence of the amboceptor in large amount.

(2) The hæmolytic amboceptor may be present in large amount in a diluted serum, without that serum having the power of inducing phagocytosis even when Dean's method of testing is employed.

(3) In the dilution experiments recorded in the paper it is shown that one may dilute the complement to such an extent as to abolish hæmolysis, and yet such a serum has a greater "opsonic" power in these dilutions than has the same serum when heated and employed in corresponding dilutions.

"Upon the Properties of an Antityphoid Serum obtained from the Goat." By Dr. Allan Macfadyen. Communicated by Dr. C. J. Martin, F.R.S.

Conclusions.—(1) The intravenous injection of the goat with the toxic cell juices of the *B. typhosus* (obtained under

the conditions described) in small and carefully regulated doses resulted in the production of an antiendotoxin.

(2) The antiendotoxin value, as so far tested, reached a point at which 1/50 c.c. of the serum neutralised thirty lethal doses of the toxic typhoid cell juice. This action was not demonstrable in 3 c.c. of normal goat's serum, and was obtained after about four months' treatment of the goat. The results, after a more rapid method of immunisation, are better *qua* goat and rabbit than those obtained by Dr. Besredka in the course of two years with dead and living bacilli *qua* horse and guinea-pig.

(3) The serum was also agglutinative for the *B. typhosus*, the titrate rising to 1/1,000,000.

(4) The serum was also bacteriolytic, 1/10,000 c.c. neutralising ten lethal doses of the *B. typhosus*.

(5) The serum did not give a precipitin reaction with typhoid cell juices.

(6) The serum, whilst neutralising the typhoid, did not neutralise the cholera endotoxin.

Entomological Society, May 2.—Mr. F. Merrifield, president, in the chair.—Fourteen examples of both sexes of *Hystriophysa talpae*, Curtis, the largest British flea, taken in the nest of a field-mouse in a tuft of grass at Grange, near Gosport, Hants, on March 28: Commander J. J. Walker.—Living specimens of *Apate capucina*, *Deilus fugax*, a *Cryptocephalus (rugicollis)*, two species of *Anthaxia*, &c., forwarded by Dr. T. A. Chapman from Ste. Maxime, South France: G. C. Champion.—An example of the weevil *Procas armillatus*, F., taken near Dartford, Kent, on April 13: F. B. Jennings. This species appears to be extremely scarce in Britain, and, with the exception of a single specimen taken near Chatham by Commander Walker in 1896, has not been recorded from this country for a considerable period.—Beetles from New Guinea, including *Aesernia meeki*, Jac., *A. costata*, Jac., *A. gestroi*, Jac., and *Cetoniadæ* and *Lucanidæ* from South Africa and Borneo: M. Jacoby.—Specimen of *Hydrochus nitidicollis*, Muls., a beetle not hitherto recorded in Britain, taken at Yelverton, in the River Meavy, in April: H. St. J. Donisthorpe.—Lantern-slide photographs (from nature) of the ♀ calcaria postica in Hymenoptera belonging to divers groups, mostly Aculeate, but including also representatives of chrysidæ, ichneumonids, and sawflies: Rev. F. D. Morice. Mr. Morice submitted that, in all the examples shown, the structure of the calcaria themselves (and also of the parts adjacent to them) clearly indicated that their main function was that of an elaborately constructed instrument for toilet purposes.—Specimens of *Mylothris agathina*, Cram., and of *Belenois thysa*, Hopff.: Dr. F. A. Dixey. The close resemblance between these species obtained chiefly in the dry-season form of the latter, and not in the wet. Dr. Dixey considered this to be a fresh illustration of the special liability to the attacks of enemies experienced under dry-season conditions, leading in some cases to the adoption of a cryptic coloration, and in others, as here, to mimicry of a protected form such as *M. agathina*.—A criticism of the late Prof. Packard's paper on the markings of organisms: H. Eltringham.—The genus *Imma*, Walk. (= *Tortricomorphæ*, Feld.): E. Meyrick.

Royal Astronomical Society, May 11.—Mr. W. H. Maw, president, in the chair.—Some points arising out of a discussion of the double stars in Struve's "Mensuræ Micrometricæ": T. Lewis. A memoir upon the subject had just been completed, and was about to be published by the society. Questions concerning the distribution of double stars, and the relation between those relatively fixed and those in motion, were considered. The facts appeared to point to the conclusion that the sun is situated in a cluster, but not centrally.—The orbit and mass of 85 Pegasi: W. Bowyer and H. H. Furner.—Some considerations concerning the number of the stars: Miss W. Gibson. The conclusions were derived from a discussion of seventy-two stars, and the relations between parallax, magnitude, and proper motion were considered.—Observations of Jupiter's sixth and seventh satellites, from photographs taken at the Royal Observatory, Greenwich: **Astronomer Royal.** A large number of plates had been taken for the positions of the satellites with exposures of

five minutes to nearly three hours. Photographs of Jupiter had also been taken, which showed that the tabular errors are very small. The results were confirmed by meridian observations.—Prints from negatives of the solar eclipse of August, 1905: **Astronomer Royal.**—Seismographic records taken at the Royal Observatory, Edinburgh: Prof. F. W. Dyson. The records showed that the trace of the San Francisco earthquake reached Edinburgh in about seven minutes.—Observations of the magnitude and position of Nova Geminorum: E. E. Barnard.—Photographs of the Milky Way taken at Mount Wilson, California, during the spring and summer of 1905: E. E. Barnard.—The president announced that news had been received that no injury had been caused to the Lick Observatory by the recent earthquake.

PARIS.

Academy of Sciences, May 14.—M. H. Poincaré in the chair.—A singular effect of friction: E. Guyou. An explanation of an experiment of M. de Saintignon. A spherical glass globe, filled with water and containing a fine powder, is rotated with a high velocity round one of its diameters as axis. The powder, if lighter than water, collects along the axis of rotation, but if heavier than water the sphere is divided into three zones, separated by two parallels of latitude equidistant from the equator. The upper and lower segments are clear, the powder being distributed in the central zone and mainly on the two boundary lines. A simple explanation is given of this paradoxical effect.—The influence of velocity on the law of deformation of metals: P. Vieille and R. Liouville.—Low temperatures and chemical analysis: MM. d'Arsonval and Bordas. An arrangement is described permitting of the direct determination of water in aqueous solutions by distillation at the ordinary temperatures, the receiver being kept at -80° C. The method is very rapid compared to those in ordinary use.—New researches on diastatic saccharification: L. Maquenne and Eug. Roux. The action of malt on starch has been studied under varying conditions of time, acidity, and nature of the starch, and the experimental results tabulated.—Three toxins of human trypanosomiasis of different origin: A. Laveran. The cases studied came from Gambia, Uganda, and Ubanghi. From the morphological point of view, no difference could be noted between them. Experiments with guinea-pigs, rats, and mice showed slight differences only. All the observations support the view that the three trypanosomes from the different localities belong to the same species.—The centres of gravity of discontinuous systems: **Haton de la Goupillière.**—A new octane, hexamethylethane: Louis Henry. This hydrocarbon is formed as a by-product in the action between the magnesium compound of tertiary butyl bromide and acetaldehyde, probably by the action of some unchanged butyl bromide upon the magnesium compound. It is a solid, volatile at the ordinary temperature, and possessing a penetrating odour. It boils at 106° C. to 107° C. under 765 mm.—An account of an earthquake at Bogota on January 31 last: M. Souhart.—A new arrangement for the spectroscopy of phosphorescent substances: C. de Wetteville. The phosphorescent substance under examination is illuminated by an electric spark about eighty-two times per second, the interval of time elapsing between the exposure to the spark and exposure to the photographic plate being about 1/3000th of a second. The period of the spark is governed by a rotating disc, and is independent of the speed of the contact breaker of the coil. The phosphorescence of bodies examined with this apparatus is very bright, and in the spectra obtained, which are rich in ultra-violet lines, none of the lines corresponding to the metal of the electrodes are visible.—The measurement of very short intervals of time by means of a condenser: M. Devaux-Charbonnel. The method is based on the measurement of the charge of a condenser through a variable resistance, first during the short interval of time to be measured, and then completely. Experimental results are given showing the accuracy obtainable to be of the order of 0.0001 sec.—The conductivity of ammonium sulphate in mixtures of sulphuric acid and water: G. Boizard.—The complete synthesis of some

camphor derivatives. Isolaurene and isolaurenic acid: G. **Blanc**. The starting point of these syntheses is α -dimethyladipic acid, the synthesis of which has been described in a previous note. The anhydride of this acid by slow distillation at the ordinary pressure gives 2:2-dimethylcyclopentanone. The tertiary alcohol obtained from this by Grignard's reaction on distillation at ordinary atmospheric pressure splits up into water and isolaurene.— α -Chlorocyclohexanone and its derivatives: L. **Bouveault** and F. **Chereau**. This substance is obtained by chlorinating either cyclohexanone or cyclohexanol in the presence of calcium carbonate. The chlorine in this derivative is reactive, potassium carbonate solution giving α -oxycyclohexanone. Substituted homologues of cyclohexanone are obtained without difficulty by the action of alkyl-magnesium compounds on chlorocyclohexanone; the methyl, ethyl, and isopropyl derivatives are described.—Stereoisomerism in the group of unsaturated $\alpha\beta$ -acyclic compounds: E. F. **Blaise** and P. **Bagard**.—The genus *Mascarenhasia*: Marcel **Dubard**.—A case of a green organ deprived of assimilating power: Jean **Friedel**. The ovary of *Ornithogalum arabicum* is green and contains chlorophyll, but is devoid of assimilating power, although the ovary of *Ornithogalum umbellatum*, which is also green, has a well-developed assimilating power. The difference is possibly due to a superficial alteration of the chlorophyll grains.—The diseases of the coffee plant in the Congo Free State: E. **De Wildeman**.—The replacement of the vibrating muscles of the wing by adipocyte columns in ants after the nuptial flight: Charles **Janet**.—A new myxosporidium of the common tench: Louis **Léger**. This species was discovered in looking for the cause of a heavy mortality of the tench, and is named by the author *Chl. cristatum*. The disease of the fish was due to other causes.—Culture of the spirillum of recurrent African fever in man (tick fever): C. **Levaditi**. Details of the method of culture are given. The virulence of the spirillum was maintained through a long series of cultures.—The pathogeny of tuberculosis: H. **Valleé**.—The terraces of the Rhone valley below Lyons: M. **de Lamothe**.—The tectonic and stratigraphical relations of Sicily and Tunis: Émile **Haug**.—The geology of Calabria: Maurice **Lugeon** and Émile **Argand**.—A method of taking samples of sea-water for bacteriological studies: P. **Portier** and J. **Richard**. The construction and use of the apparatus are made clear by four diagrams.—The increase in the flow due to the cold season in the Seine and Loire basins: Edmond **Maillet**.—The mineralisation of subterranean waters and the causes of its variation: F. **Dienert**.—The Abannets of Nîmes, Belgium: E. A. **Martel** and E. Van den **Broeck**.

DIARY OF SOCIETIES.

THURSDAY, MAY 31.

ROYAL SOCIETY, at 4.30.—On the Main Source of "Precipitable" Substances and on the Role of the Homologous Proteid in Precipitin Reactions: D. A. Welsh and H. G. Chapman.—The Viscosity of the Blood: A. du Pre Denning and J. H. Watson.—The Affinity Constants of Amphoteric Electrolytes, i., Methyl Derivatives of Para-Aminobenzoic Acid and of Glycine: J. Johnston.—The Affinity Constants of Amphoteric Electrolytes, ii., Methyl Derivatives of Ortho- and Meta-aminobenzoic Acids: A. C. Cumming.—The Affinity Constants of Amphoteric Electrolytes, iii., Methylated Amino-acids: Prof. J. Walker, F.R.S.

ROYAL INSTITUTION, at 5.—Man and the Glacial Period: Prof. W. J. Sollas, F.R.S.

FRIDAY, JUNE 1.

ROYAL INSTITUTION, at 9.—L'Ébullition des Metaux: Prof. H. Moissan, For. Mem. R.S.

TUESDAY, JUNE 5.

ROYAL INSTITUTION, at 5.—Northern Winter Sports, Sweden and its People: Colonel V. Balck.

WEDNESDAY, JUNE 6.

SOCIETY OF PUBLIC ANALYSTS, at 8.

ENTOMOLOGICAL SOCIETY, at 8.—(1) Predaceous Insects: (2) On some Forms of *Papilio dardanus*: Prof. E. B. Poulton, F.R.S.—Notes on the Blattidae: R. Shelford.—On the Bionomics of some Butterflies from the Victoria Nyanza Region: S. A. Neave.

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THURSDAY, JUNE 7.

ROYAL SOCIETY, at 4.30.—*Probable Papers*: On the Osmotic Pressures of some Concentrated Solutions: The Earl of Berkeley and E. G. J. Hartley.—An Account of the Pendulum Observations made at Kew and Greenwich Observatories in 1903: Major G. P. Lenox-Conyngham.—The Self-induction of an Iron Cylinder: Prof. E. Wilson.

ROYAL INSTITUTION, at 5.—Man and the Glacial Period: Prof. W. J. Sollas, F.R.S.

LINNEAN SOCIETY, at 8.—On Two New Species of *Populus* from Darjeeling: H. H. Haines.—Biscayan Plankton, part viii., The Cephalopoda: W. E. Hoyle.—Part ix., The Medusae: E. T. Browne.

CHEMICAL SOCIETY, at 8.30.—Ammonium Selenate and the Question of Isodimorphism in the Alkali Series: A. E. H. Tutton.—An Improved Beckman Apparatus for Molecular Weight Determination: J. M. Sanders.—Resolution of Lactic Acid by Morphine: J. C. Irvine.—The Vapour Pressures of Binary Mixtures, part i., The Possible Types of Vapour-pressure Curves: A. Marshall.—Action of Sodium on α -Dichloropropylene: I. Smedley.—Thiocarbamide as a Solvent for Gold: J. Moir.—The Action of Sulphur Dioxide and Aluminium Chloride on Aromatic Compounds: S. Smiles and R. Le Rossignol.

FRIDAY, JUNE 8.

ROYAL INSTITUTION, at 9.—Studies on Charcoal and Liquid Air: Sir James Dewar, F.R.S.

PHYSICAL SOCIETY, at 8.—On the Solution of Problems in Diffraction by the Aid of Contour Integration: H. Davies.—The Effect of Radium in Facilitating the Visible Electric Discharge in *vacuo*: A. A. Campbell Swinton.—Mr. J. Goold's Experiments with a Vibrating Steel Plate, exhibited by Messrs. Newton and Co.—Fluid (liquid) resistance: Col. de Villamil.

ROYAL ASTRONOMICAL SOCIETY, at 5.

GEOLOGISTS' ASSOCIATION, at 8.—The Higher Zones of the Upper Chalk in the Western Part of the London Basin: H. J. Osborne White and Ll. Treacher.

MALACOLOGICAL SOCIETY, at 8.—Mollusca of the *Porcupine* Expeditions, 1869-70, Supplemental Notes, part iii.: E. R. Sykes.—Notes on the Dates of Publication of the "Mineral Conchology" and "Genera Rec. Foss. Shells": E. R. Sykes.—Description of *Oliva ispidula*, L. var. *longispira*: F. G. Bridgman.—On *Chloritis heteromphalus*: H. A. Pilsbry.

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